GB 2237911 (1)
G06F15/20F5R-G09G1/00-G06F3/033A2-

- 3- *-G06F3/033A2

(19) GB (11) 2 237 911 (13) A

(43) Date of A publication 15.05.1991

(21) Application No 9022562.4

(22) Date of filing 17.10.1990

(30) Priority data
(31) 01270993 (32) 17.10.1989 (33) JP

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(51) INT CL[5]
G09G 5/40

(52) UK CL (Edition K)
G4H HSU HTAT H1A H13D

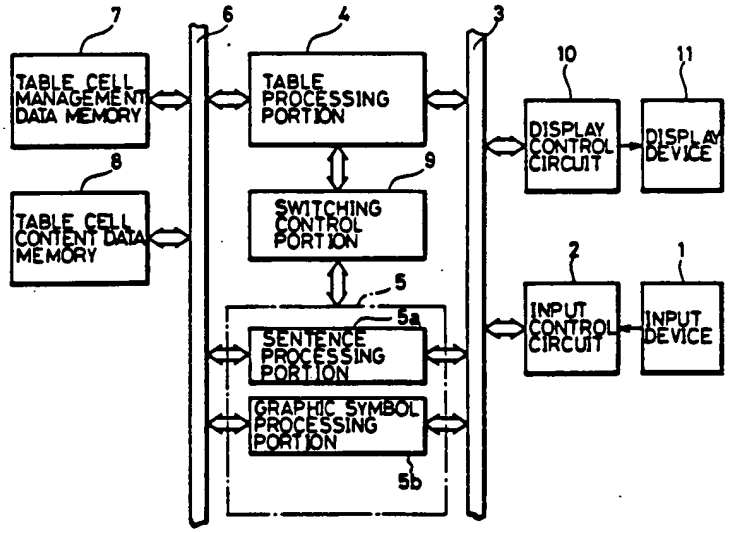
(56) Documents cited
GB 2092346 A EP 0215203 A2 EP 0200454 A2
EP 0123109 A2 EP 0109581 A2

(58) Field of search
UK CL (Edition K) G4H HSD HSE HSU HSV HTAL HTAR HTAS HTAT
INT CL[5] G06F, G09G

(54) Display processing system

(57) First, a table composed of a plurality of cells is initialized. At this time, the positional data, the size data and the medium of each cell are stored in a table cell management data memory 7 for each cell. Subsequently, editing activity in each cell is performed, which is performed individually for each cell according to the management data of each cell stored in the table cell management data memory 7. Furthermore, when editing activity is performed for each cell, a data processing portion of a corresponding medium in a multimedia processing portion 5 is selectively enabled. In this way, not only characters but also graphic symbols, images and so forth can be displayed in each cell.

FIG.1



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TITLE OF THE INVENTION

Display Processing System

BACKGROUND OF THE INVENTION

Field of the Invention

The present Invention relates to a display processing system, and more particularly, to a system for efficiently forming and displaying tables in an information processor such as a personal computer and a word processor.

DESCRIPTION OF THE BACKGROUND ART

Some of conventional information processors such as personal computers and word processors have a tabulating function.

However, in the tabulating function of conventional information processors, only characters could be displayed in each cell (a region divided by ruled lines, which is 1 unit constituting a table) of a table. Accordingly, the tabulating function of conventional information processors had a program of inferior versatile expressing ability.

Also, the tabulating function of conventional information processors handles an entire table as a sentence unit and could not perform editing individually for each cell. Therefore, they have had a problem that an operator must input data in consideration of arrangement and size of each cell not to disturb the character string between the respective cells, which makes operator's

activity complicated.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a display processing system which can perform tabulating in versatile expressing forms.

It is another object of the present invention to provide a display processing system which can insert not only characters but also information in various expressing forms such as graphic symbols and image into each cell of a table.

It is still another object of the present invention to provide a display processing system which can perform various processings (input processing, edit processing, etc.) for each cell when forming a table.

A display processing system according to the present invention is a system for displaying at least tables composed of a plurality of cells, and includes input means, management data forming means, cell management data storing means, multimedia processing means, selective enabling means and cell content data storing means. The input means inputs data necessary for display processing. The management data forming means forms management data for each cell according to input data from the input means. The cell management data storing means stores management data for each cell. The multimedia processing

means has a plurality of data processing portions for processing data input from the input means, each of which data processing portions is made to process data expressed in an expressing form different from each other. The selectively enabling means selectively enables a data processing portion of a corresponding expressing form in the multimedia processing means according to management data of a corresponding cell stored in the management data storing means when one of cells is specified by the input means. The cell content data storing means stores the data processed by the multimedia processing means for each cell.

According to the present invention, contents of a table is managed for each cell unit, and data is processed for each cell and individually stored. Accordingly, without influence on other cells, input activity and edit activity can be independently performed for each cell unit. As a result, the operator does not have to input data in consideration of positional relationship and size of the respective cells, so that the tabulating activity of the operator can be considerably reduced as compared to a conventional case.

Furthermore, according to the present invention, data processing of plural kinds of expressing forms can be performed by the multimedia processing means, so that

contents in each cell can be expressed in plural kinds of expressing forms. Accordingly, one table can be expressed in versatile expressing forms, which largely enhances the expressing ability of a table as compared to tables formed by conventional information processors.

The foregoing and other objects, features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing configuration of one embodiment of the present invention.

Fig. 2 is a diagram showing one example of a table formed by the embodiment shown in Fig. 1.

Fig. 3 is a diagram showing the data structure of the table cell management data memory in Fig. 1.

Fig. 4 is a diagram showing the data structure of the table cell content data memory in Fig. 1.

Figs. 5 and 6 are flow charts for describing operation of the embodiment shown in Fig. 1.

Fig. 7 is a block diagram showing the configuration of another embodiment of the present invention.

Fig. 8 is a diagram showing one example of a display screen for one page formed by the embodiment shown in Fig.

7.

Fig. 9 is a diagram showing the data structure of the frame management data memory in Fig. 7.

Fig. 10 is a diagram showing the data structure of the frame content data memory in Fig. 7.

Fig. 11 is a flow chart for describing operation of the embodiment shown in Fig. 7.

Fig. 12 is a block diagram showing the configuration of still another embodiment of the present invention.

Fig. 13 is a block diagram showing the configuration of yet another embodiment of the present invention.

Fig. 14 is a diagram showing one example of a table formed by the embodiment shown in Fig. 13.

Fig. 15 is a diagram showing one data structure of a cell management data stored for each cell in the table cell management data memory in Fig. 13.

Figs. 16-18 are flow charts for describing operation of the embodiment shown in Fig. 13.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

First, referring to Fig. 1, the configuration of one embodiment of the present invention will be described. An input device 1 including key boards, a mouse and so forth inputs data necessary for display processing. Here, the data necessary for display processing includes coordinate data, display content data, input positioning data and so

forth. The input data from input device 1 is supplied to an input/output data bus 3 through an input control circuit 2. A table processing portion 4, a multimedia processing portion 5 are connected to this input/output data bus 3. Table processing portion 4, which performs various processes concerning table formation, performs table area setting, cell setting, and specifying of cells specified by input device 1, for example. Multimedia processing portion 5 includes a plurality of data processing portions for processing data inputted from input device 1. Each data processing portion is made to process data expressed in an expressing form different from each other. In the embodiment shown in Fig. 1, multimedia processing portion 5 includes as data processing portions a sentence processing portion 5a and a graphic symbol processing portion 5b and so forth. Sentence processing portion 5a processes input data as sentence data. Graphic symbol processing portion 5b processes input data as graphic data. Table processing portion 4 and multimedia processing portion 5 are connected to a table cell management data memory 7 and a table cell content data memory 8 through internal data bus 6. Table cell management data memory 7 stores the management data of cells in a table for each cell. Table cell content data memory 8 stores the data processed by

multimedia processing portion 5 for each cell. A switching control portion 9 is provided between table processing portion 4 and multimedia processing portion 5. This switching control portion 9 is for switching a control right of the system between table processing portion 4 and multimedia processing portion 5. Display control circuit 10 is also connected to input/output data bus 3. This display control circuit 10 display-drives a display device 11 according to the display data such as a formed table. Thus, data such as a table is displayed on display device 11.

Fig. 2 is a diagram showing one example of a table formed by the embodiment shown in Fig. 1. The table TA displayed in a display screen 110 in display device 11 has six cells C1-C6, for example. Data can be displayed in various expressing forms (e.g. characters, graphic symbols) in the respective cells C1-C6.

Fig. 3 is a diagram showing the data structure of table cell management data memory 7 in Fig. 1. As shown in the figure, in table cell management data memory 7, management data for each cell is stored. The management data for one cell includes the coordinate data X, Y showing position of that cell, the data x, y showing size of that cell, pointer data Pa showing head address of an area corresponding to that cell in table cell content data

memory 8, and media flag MD specifying an expression form of contents to be displayed in that cell. Here, the above coordinate data X, Y are coordinate data of which origin is located at the left upper corner of the table to which the cell belongs as shown in Fig. 2. Also, the above size data x, y include the length x in the lateral direction and the length y in the longitudinal direction of the cell.

Fig. 4 is a diagram showing the data structure of table cell content data memory 8 in Fig. 1. As shown in the figure, table cell content data memory 8 stores for each cell the content data to be displayed in each cell.

Next, operation of the embodiment shown in Fig. 1 will be described.

First, referring to Fig. 5, initialization operation of the table will be described. First, in the step S1, setting operation of table areas is performed. That is, it is set in which region on the screen 110 of display device 11 (refer to Fig. 2) the table is to be displayed. More specifically, the data specifying the display region of the table is input from input device 1 and the size and position of the table is set in table processing portion 4. Subsequently, in the step S2, cells in the table are set. That is, data specifying positions of ruled lines for division inside the table is inputted from input

device 1, and table processing portion 4 finds positional data and size data of each cell according to this positioning data. Then, table processing portion 4 secures data storing area of each cell in table cell management data memory 7 and also stores positional data and size data of a cell corresponding to each data storing area. Next, in the step S3, it is set in which medium or expressing form the contents of each cell should be expressed. That is, each cell is individually specified by input device 1 and media specifying data in the respective cells are inputted. Table processing portion 4 sets media flag MD (refer to Fig. 3) of each cell in table cell management data memory 7 according to the media specifying data inputted from input device 1. Thus, initialization operation of a table is completed.

Next, referring to Fig. 6, operation of forming contents to be displayed in each cell in a table will be described. First, the operator has to decide which cell's contents are to be formed. To this end, the operator specifies a cell to be an object of activity by input device 1. In response to this, table processing portion 4 specifies which cell has been specified according to the cell specifying data from input device 1 in the step S11. Also, table processing portion 4 reads corresponding cell's positional data, size data and media flag MD from

table cell management data memory 7, and provides them to switching control portion 9. In this way, the control right of the system moves to switching control portion 9 from table processing portion 4. Accordingly, switching control portion 9 makes a determination as to the media of a cell currently specified according to the media flag MD provided from table processing portion 4 (Step S12). According to the determination result, switching control portion 9 transfers the positional data and the size data of the cell to the corresponding medium data processing portion in multimedia processing portion 5, and also shifts the control right of the system to the corresponding data processing portion. Accordingly, in multimedia processing portion 5, the data processing portion obtained the control right of the system processes the data of the cell inputted from input device 1 (editing process and so forth). For example, if the medium of the specified cell is the sentence, the data processing by sentence processing portion 5a is performed in the step S13. If the medium of the specified cell is the graphic symbol, in step S15, data processing by graphic symbol processing portion 5b is performed. Each data processing portion 5a, 5b, ••• in multimedia processing portion 5 continues process of the data until input of the content data of the specified cell at that time is completed

(steps S14, S16). As the data processing for one cell is completed, it advances to the step S17, switching control portion 9 determines whether another cell in the same table has been specified or not. When another cell in the same table is specified, the control right of the system is moved to table processing portion 4 and operations after the step S11 are repeated again. A series of operations as described are performed for each cell. At this time, the data processed by each data processing portion 5a, 5b, ... in multimedia processing portion 5 are stored in table cell content data memory 8 for each cell. When processing of the content data of all the cells or given cells is completed, the activity of forming a table is completed.

In parallel with operations shown in Figs. 5 and 6, corresponding contents are displayed in display device 11. Accordingly, the operator can proceed the activity of forming a table while watching the displayed contents on display device 11.

In some conventional information processors, not only sentences but also graphic symbols and image are displayed in display regions other than a table in a display device. Such conventional information processors have a multimedia processing portion as well as the embodiment shown in Fig. 1. However, the multimedia

processing portion in a conventional information processor, is employed for a display region other than a table, so that only sentences could be processed in the table. The multimedia processing portion included in such a conventional information processor as described above generally has high level editing functions (for example, a function for displaying sentences divided into a plurality of columns, a function for displaying various kinds of graphs etc.). Accordingly, if such a multimedia processing portion as includes such a high level editing function can be also employed for processing of each cell of a table, a high level editing function for each cell can be implemented. Also, if the multimedia processing portion can also be employed for processing in display regions both for table forming and for other ones, the waste of device configuration can be eliminated to reduce cost of the device. Fig. 7 is a block diagram showing the configuration of another embodiment of the present invention devised to satisfy the above described demands.

In the embodiment shown in Fig. 7, a frame management data memory 12 and a frame content data memory 13 are connected to an internal data bus 6. Frame management data memory 12 stores the data managing the display region of display device 11 for each frame unit. Frame content data memory 13 stores the content data of each frame

processed in multimedia processing portion 5. Other configurations are similar to those in the embodiment shown in Fig. 1, and the same reference numerals are assigned to the corresponding portions and the description is not repeated here.

Fig. 8 is a diagram showing one example of display contents for one page formed by the embodiment shown in Fig. 7. In the figure, a table TA, a frame F1, and a frame F2 are displayed on a display screen 110 of a display device. Furthermore, in other regions of display screen 110, a sentence SE is displayed.

Fig. 9 is a diagram showing the data structure of the frame management data memory 12 in Fig. 7. In the figure, frame management data memory 12 stores management data of each frame for each frame. The management data of each frame, as shown in the left-hand side of Fig. 9, includes coordinate data X, Y showing a position of each frame, the data x, y showing size of each frame, pointer data Pf showing head address of a area in which the content data of a corresponding frame is stored in frame content data memory 13, and media flag MD specifying a medium of each frame. Frame management data memory 12 further stores the table management data. That is, frame management data memory 12 manages a table as a kind of frame. The table management data stored in frame management data memory 12,

as shown in the right-hand side of Fig. 9, includes coordinate data X, Y showing a position of a table, data x, y showing a size of a table, pointer data Pe showing head address of table cell management data memory 7, and media flag MDt showing that this management data is not that of ordinary frame F1, F2, ... but management data of a table.

Fig. 10 is a diagram showing the data structure of frame content data memory 13 in Fig. 7. As shown in the figure, the content data of each frame F1, F2, ... are stored in frame content data memory 13. The content data of each cell in the table is stored in table cell content data memory 8 similarly to the embodiment shown in Fig. 1.

Next, operation of the embodiment shown in Fig. 7 will be described.

First, by operation similar to that shown in the flow chart of Fig. 5, setting of table areas, setting of cells, setting of medium of each cell are performed.

Next, referring to Fig. 11, operation of forming contents of a table and a frame will be described. First, it is necessary to specify which region is to be an object of processing in display screen 110 of display device 11. Therefore, the operator operates input device 1 to specify the next input position. The specifying data of an input position from input device 1 is taken into table

processing portion 4 or each data processing portion 5a, 5b, ... in multimedia processing portion 5 performing processing at present, and a determination is made as to if the specified position is a region currently being processed or not (the step S21). When the same region as the region currently processed is specified, the current process is continued. On the other hand, when a region different from the region currently processed is specified, the control right of the system is moved from display processing portion 4 or multimedia processing portion 5 to switching control portion 9. Switching control portion 9 determines which frame in one page is specified by the position specified by input device 1 referring to the data in frame management data memory 12 shown in Fig. 9 in the step S23. Subsequently, advancing to the step S24, switching control portion 9 determines a medium or a type of that frame according to the media flag MD or Mdt included in the management data of a frame specified in the step S23, to shifts the control right of the system to the corresponding processing portion. At this time, if not ordinary frame F1, F2, ••• but a table TA is specified, in the step S25, contents of a cell in a table is formed. That is, in the step S25, operation similar to that shown in the flow chart of Fig. 6 is performed to form the content of each cell in the table.

On the other hand, when any of ordinary frames F1, F2, ••• is specified, switching control portion 9 shifts the control right of the system to a data processing portion corresponding to a medium of the specified frame. As a result, in a data processing portion which obtained the control right of the system, the data of the frame inputted from input device 1 is processed (the steps S26-S29). A series of operations described above are performed for each frame.

Fig. 12 is a block diagram showing the configuration of a modified embodiment of the display processing system shown in Fig. 7. This embodiment of Fig. 12 is made to be able to form a plurality of tables in one page. Therefore, the embodiment of Fig. 12 has a plurality of table cell management data memories 71-7N for each table and a plurality of table cell content data memories 81-8N. Table cell management data memories 71-7N and table cell content data memories 81-8N are switched according to a table to be formed. The frame management data memory 12 stores the table management data shown in Fig. 9 for each table.

Fig. 13 is a block diagram showing the configuration of still another embodiment of the present invention. In the figure, the embodiment of Fig. 13 has a frame processing portion 14 in parallel with table processing

portion 4. Other configurations are same as those of the embodiment shown in Fig. 7, and the same reference numerals are assigned to the corresponding portions and the description thereof is not repeated here.

Fig. 14 is a diagram showing one example of a table formed by the embodiment shown in Fig. 13. In the figure, the table TA includes three cells C1-C3, for example. Furthermore, in the cell C3, a frame CF is formed. That is to say, in the embodiment shown in Fig. 13, a frame can be further formed in a cell constituting a table. Furthermore, in a embodiment shown in Fig. 13, a region surrounded by the frame CF and other regions can be individually edited in the cell C3 shown in Fig. 14, for example.

Fig. 15 is a diagram showing the data structure about one cell of the table cell management data stored in table cell management data memory 7 in Fig. 13. As shown in the figure, as compared with the table cell management data shown in Fig. 3, the pointer data Pw is added to the table cell management data in the embodiment of Fig. 13. This pointer data Pw is data indicating a head address of an area in which a corresponding frame management data in frame management data memory 12 is stored (as for the data structure, refer to Fig. 9). By resetting the value of this pointer data Pw at 0 or the like, it is known that

there is no frames in this cell.

Next, operation of the embodiment shown in Fig. 13 will be described.

First, referring to Fig. 16, operation for forming a frame in a cell of a table will be described. In this case, the operator operates input device 1 to specify in which cell and at which position a frame is to be formed. The frame forming position specifying data from input device 1 is taken into frame processing portion 14 in the step S31. Frame processing portion 14 determines if the position specified by input device 1 exists in the table or out of the table in the step S32. According to the result of the determination, when the specified position exists in the table, frame processing portion 14 requests table processing portion 4 to determine which cell in the table is specified. Table processing portion 4, according to the request from frame processing portion 14, performs activity to specify the specified cell in the step S33. Next, in the step S35, frame processing portion 14 secures a position in which the frame content data is to be stored in frame content data memory 13. Subsequently, in the step S36, frame processing portion 14 catalogs the information concerning a frame formed in frame management data memory 12. Finally, in the step S37, frame processing portion 14 sets the head address of a storing

area of a corresponding frame management data in frame management data memory 12 at the pointer data Pw of a corresponding cell in table cell management data memory 7.

Next, referring to Fig. 17, operation for specifying a frame in order to form the contents of the frame formed in a cell of a table will be described. First, as an input position is designated from input device 1, the input position designating data is taken into processing portion 4 or 5 or 14 which is currently performing process in the step S41. The processing portion which captured the input position designating data makes a determination as to if the designated input position is in or out of the region being processed in the step S42. If the designated input position exists in the region which is now processed, the current process is continued. On the other hand, if the designated input position exists out of the region which is now processed, the control right of the system shifts to switching control portion 9 from the above processing portion. Accordingly, switching control portion 9 makes a determination as to whether the designated input position is in the frame or in the table in the step S43. If the designated input position is in the frame, the data process concerning a frame is performed. On the other hand, if the designated input position is in a table, switching control position 9

shifts the control right of the system to table processing portion 4. Accordingly, table processing portion 4 specifies which cell is specified in the step S44. Subsequently, table processing portion 4 reads out pointer data Pw of a corresponding cell from table cell management data memory 7, and reads out the positional data and the size data of a corresponding frame from frame management data memory 12 according to the pointer data Pw. Next, table processing portion 4, according to the data read out from frame management data memory 12, determines if the input position currently designated is in the frame formed in the cell or not in the step S45. If the input position now designated is out of the frame, operation for forming contents of regions other than the frame in the cell is performed according to the flow chart of Fig. 18 (the details thereof will be described later). On the other hand, if the input position being designated is in a frame, table processing portion 4 shifts the control right of the system to switching control portion 9. Accordingly, switching control portion 9 reads out the media flag MD included in the management data of a corresponding frame in frame management data memory 12 to determined in which medium that frame is set in the step S46. Next, switching control portion 9 shifts the control right of the system to a data processing portion of a

corresponding medium in multimedia processing portion 5 according to the determination result in the step S46. Thus, a data processing portion of the medium corresponding to the frame being specified processes the data of the frame inputted from input device 1 (steps S47-S50). The frame content data processed at this time by multimedia processing portion 5 is stored in frame content data memory 13 for each frame.

Next, referring to Fig. 18, operation of forming contents of a region outside of a frame in a cell having a frame will be described. As described above, the operation of Fig. 18 is carried out when an input position which is specified at that time is determined to be a region out of a frame of a cell having a frame in the step S45 of Fig. 17. First, the control right of the system is shifted from table processing portion 4 to switching control portion 9. Accordingly, switching control portion 9 reads media flag MD of a corresponding cell from table cell management data memory 7 to determine in the step S51 at which medium the specified cell is set. Subsequently, switching control portion 9 reads pointer data Pw of a corresponding cell from table cell management data memory 7 and transfers the pointer data Pw to a data processing portion in multimedia processing portion 5 corresponding to the result of a determination in the step S51 (steps

S52, S55). Next, switching control portion 9 shifts the control right of the system to the data processing portion to which the pointer data Pw is transferred. Accordingly, the data processing portion which obtained the control right of the system performs data processing of a region other than a frame in a cell (steps S53, S54 or S56, S57). Thus, the contents in a region out of a frame in a cell is formed. At this time, each data processing portion 5a, 5b, ••• in multimedia processing portion 5 reads the positional data and the size data of a corresponding frame from frame management data memory 12 according to the pointer data Pw supplied from switching control portion 9 and performs data processing, in which characters and graphic symbols do not get in the frame.

In each embodiment described above, table processing portion 4, multimedia processing portion 5, switching control portion 9 and frame processing portion 14 may be implemented by program processing by a computer or may be structured as an individual hard circuit.

Although the present invention has been described and illustrated in detail, it is clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and scope of the present invention being limited only by the terms of the appended claims.

CLAIMS:

1. A display processing system for displaying at least a table composed of a plurality of cells, comprising:

input means for inputting data necessary for display process;

management data forming means for forming management data for each said cell according to the input data from said input means;

cell management data storing means for storing said management data for each cell;

multimedia processing means having a plurality of data processing portions for processing the data provided from said input means, each of which data processing portions being structured to process data expressed in expressing forms different from each other; and

means for selectively enabling a data processing portion of a corresponding expressing form in said multimedia processing means according to management data of a corresponding cell stored in said management data storing means when any of said cells is specified by said input means; and

cell content data storing means for storing for each said cell the data processed by said multimedia processing

means.

2. The display processing system according to claim 1, wherein said management data for each cell comprises positional data of a cell and data specifying an expressing form of content of a cell.

3. The display processing system according to claim 2, wherein said selectively enabling means selectively enables a data processing portion in said multimedia processing means according to said expressing form specifying data.

4. The display processing system according to claim 1, further comprising;

frame management data storing means for storing data for managing a display region other than said table; and

means for selectively enabling a data processing portion of a corresponding expressing form in said multimedia processing means according to management data of a corresponding frame stored in said frame management data storing means when any of said frames is specified by said input means, whereby said multimedia processing means is used both for data processing for cells and for data processing for frames.

5. The display processing system according to claim 1, further comprising:

in-cell frame management data forming means for forming management data concerning a frame to be displayed in said cell according to the input data from said input means;

in-cell frame management data storing means for storing management data concerning a frame to be displayed in said cell;

means for selectively enabling a data processing portion of a corresponding expressing form in said multimedia processing means according to management data concerning a corresponding frame stored in said in-cell frame management data storing means when a frame in said cell is specified by said input means; and

frame content data storing means for storing the data processed by said multimedia processing means for each frame.

6. A display processing system for controlling a display device to form a display which includes a display region consisting of a plurality of display zones or cells, said system comprising:

cell management data storage means for storing data required for the management of the respective cells, including content form data indicative of the form of display matter for each cell;

data processing means selectively operable in accordance with said content form data in different modes of display data processing corresponding to said different forms of display matter; and

cell content data storage means for storing for each respective cell the display data as processed by said data processing means for that cell.

7. A display processing system substantially as hereinbefore described with reference to Figures 1 to 6 of the accompanying drawings.

8. A display processing system substantially as hereinbefore described with reference to Figures 7 to 11 of the accompanying drawings.

9. A display processing system substantially as hereinbefore described with reference to Figure 12 of

the accompanying drawings.

10. A display processing system substantially as hereinbefore described with reference to Figures 13 to 18 of the accompanying drawings.

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FIG.18

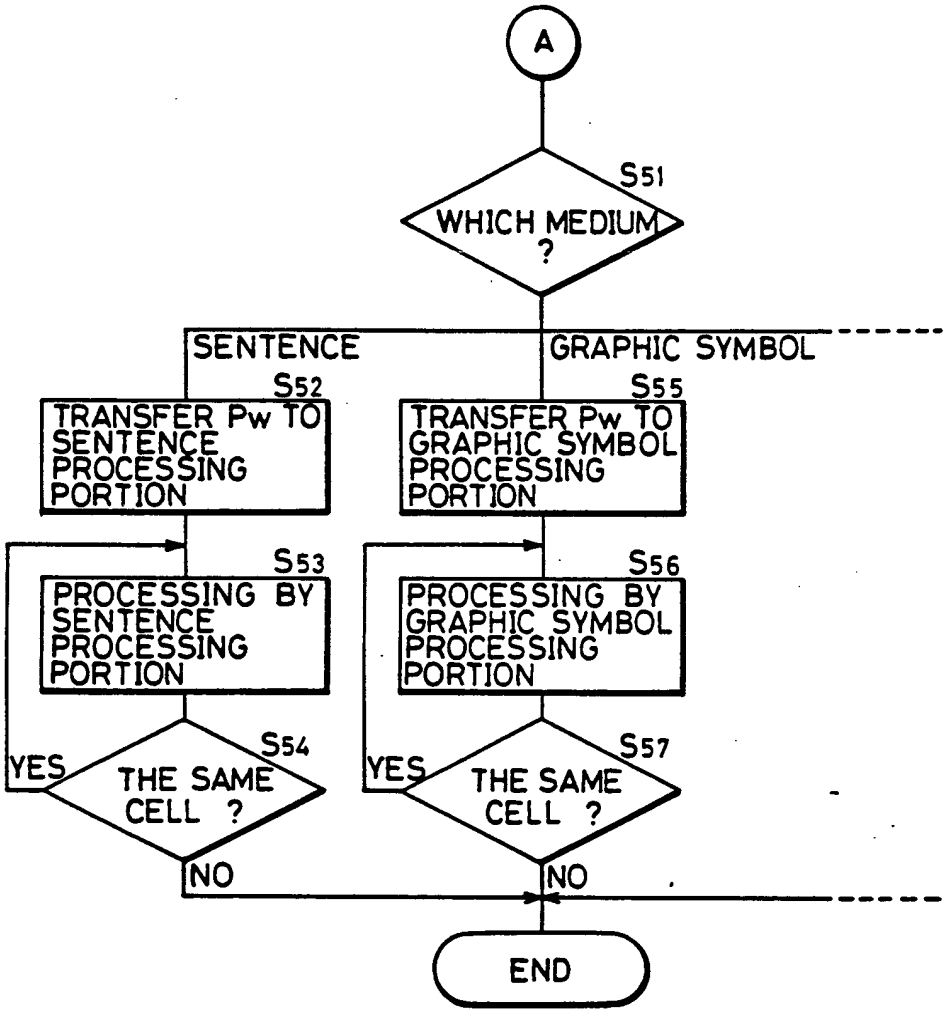

A
S51
WHICH MEDIUM ?
SENTENCE
GRAPHIC SYMBOL
S52
TRANSFER Pw TO SENTENCE PROCESSING PORTION
S55
TRANSFER Pw TO GRAPHIC SYMBOL PROCESSING PORTION
S53
PROCESSING BY SENTENCE PROCESSING PORTION
S56
PROCESSING BY GRAPHIC SYMBOL PROCESSING PORTION
S54
YES
THE SAME CELL ?
S57
YES
THE SAME CELL ?
NO
NO
END

FIG.17

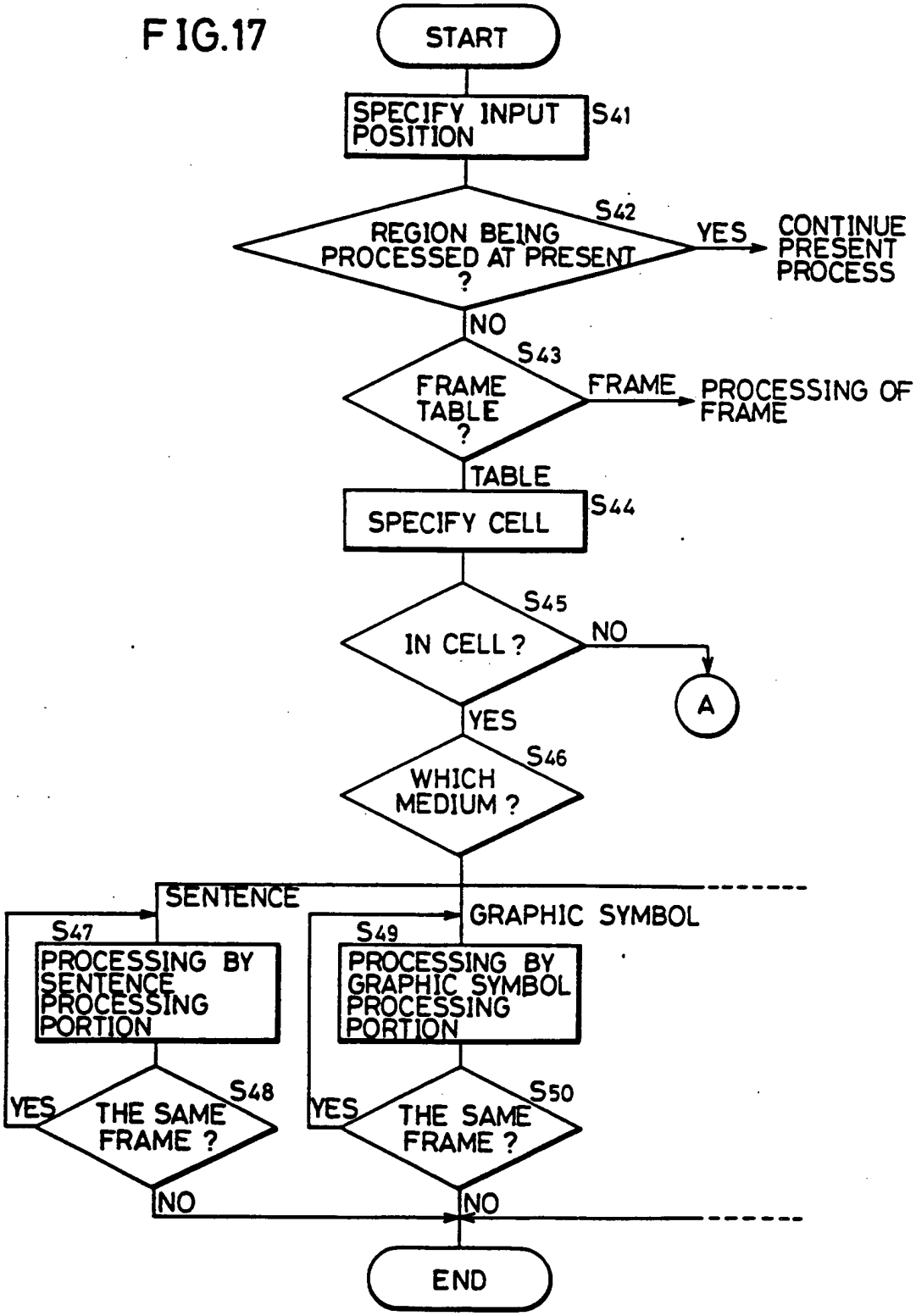

START
SPECIFY INPUT POSITION
S41
S42
REGION BEING PROCESSED AT PRESENT ?
YES
CONTINUE PRESENT PROCESS
NO
S43
FRAME TABLE ?
FRAME
PROCESSING OF FRAME
TABLE
SPECIFY CELL
S44
S45
IN CELL ?
NO
A
YES
S46
WHICH MEDIUM ?
SENTENCE
GRAPHIC SYMBOL
S47
PROCESSING BY SENTENCE PROCESSING PORTION
S49
PROCESSING BY GRAPHIC SYMBOL PROCESSING PORTION
YES
S48
THE SAME FRAME ?
YES
S50
THE SAME FRAME ?
NO
NO
END

FIG.16

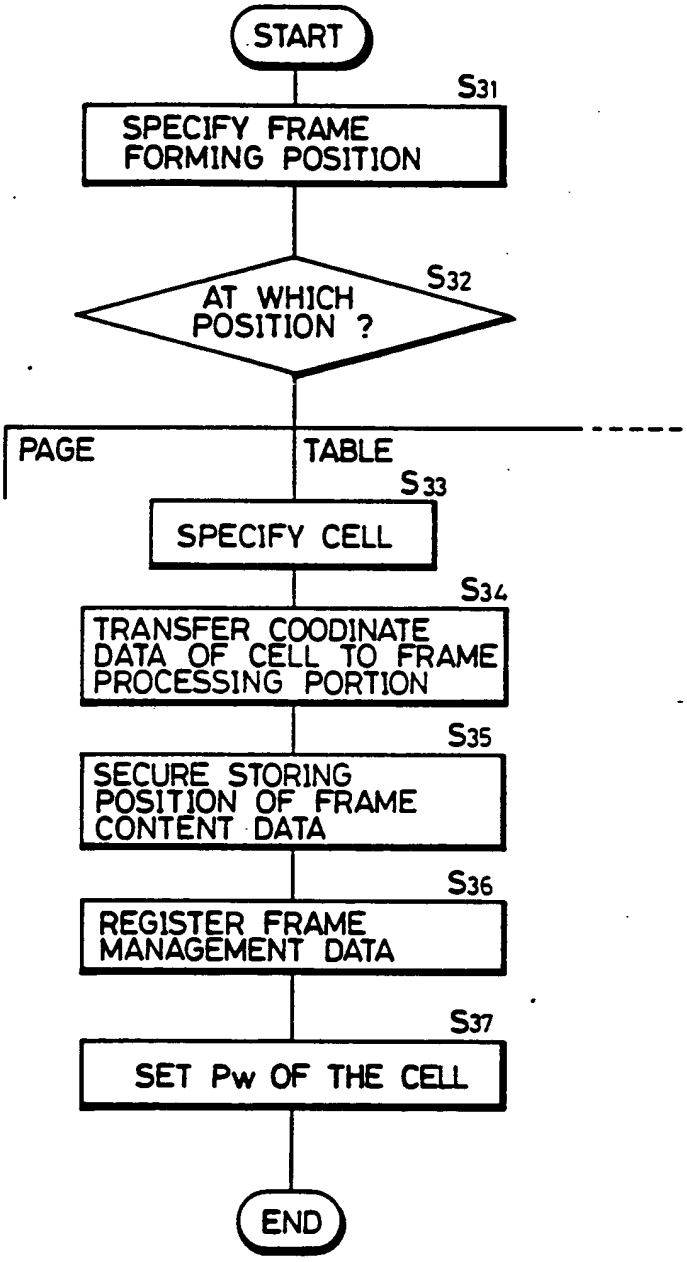

START
S31
SPECIFY FRAME FORMING POSITION
S32
AT WHICH POSITION ?
PAGE
TABLE
S33
SPECIFY CELL
S34
TRANSFER COODINATE DATA OF CELL TO FRAME PROCESSING PORTION
S35
SECURE STORING POSITION OF FRAME CONTENT DATA
S36
REGISTER FRAME MANAGEMENT DATA
S37
SET Pw OF THE CELL
END

FIG.14

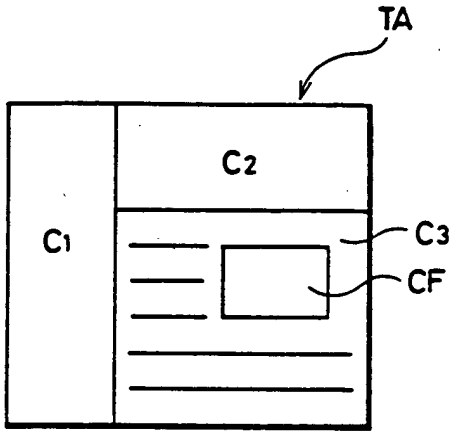


FIG.15

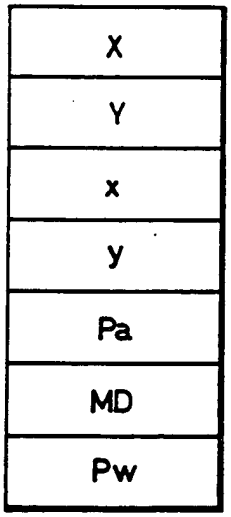


FIG.13

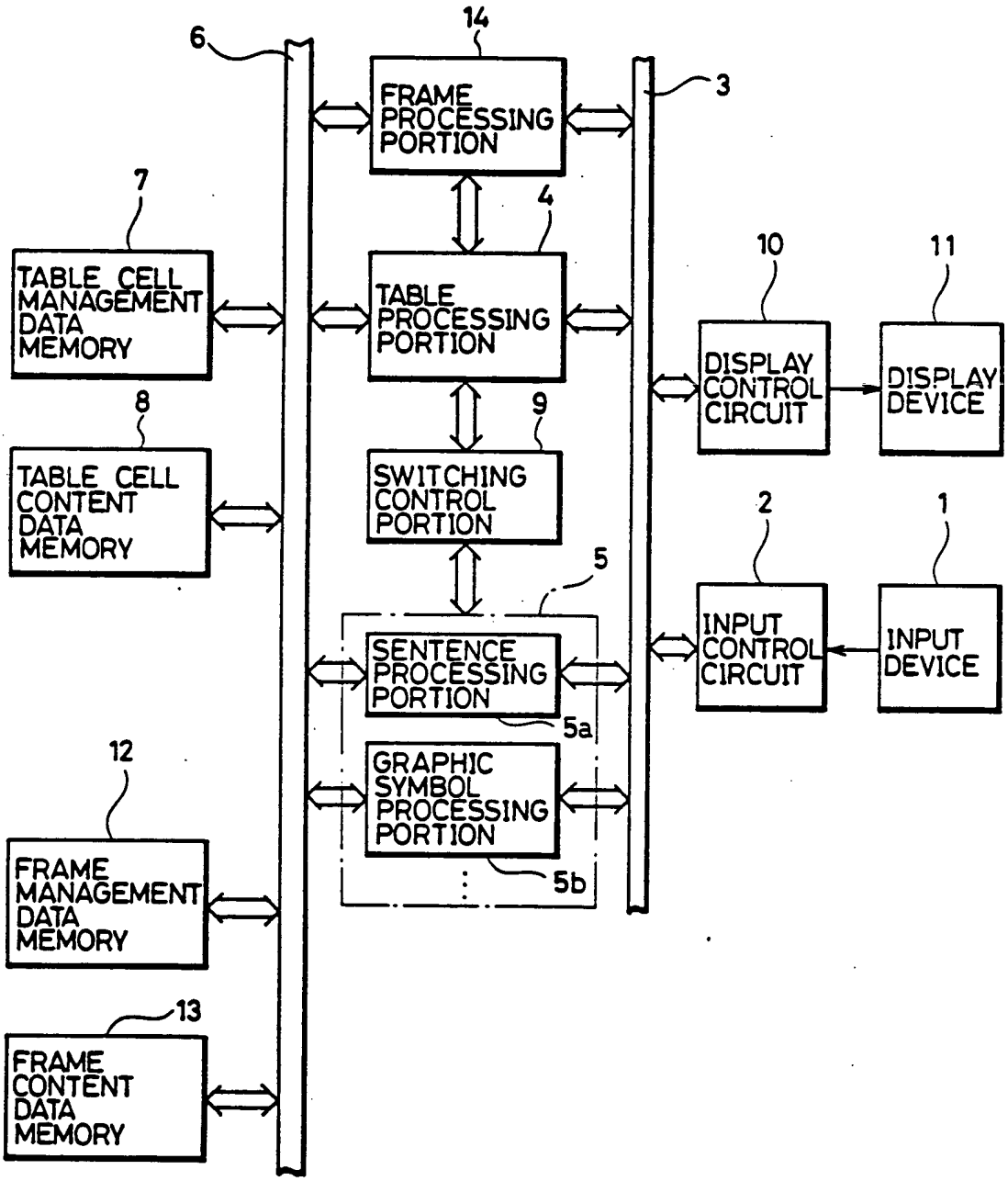

6
14
FRAME PROCESSING PORTION
3
7
4
TABLE CELL MANAGEMENT DATA MEMORY
TABLE PROCESSING PORTION
10
11
DISPLAY CONTROL CIRCUIT
DISPLAY DEVICE
8
9
TABLE CELL CONTENT DATA MEMORY
SWITCHING CONTROL PORTION
2
1
5
INPUT CONTROL CIRCUIT
INPUT DEVICE
SENTENCE PROCESSING PORTION
5a
12
GRAPHIC SYMBOL PROCESSING PORTION
FRAME MANAGEMENT DATA MEMORY
5b
13
FRAME CONTENT DATA MEMORY

FIG.12

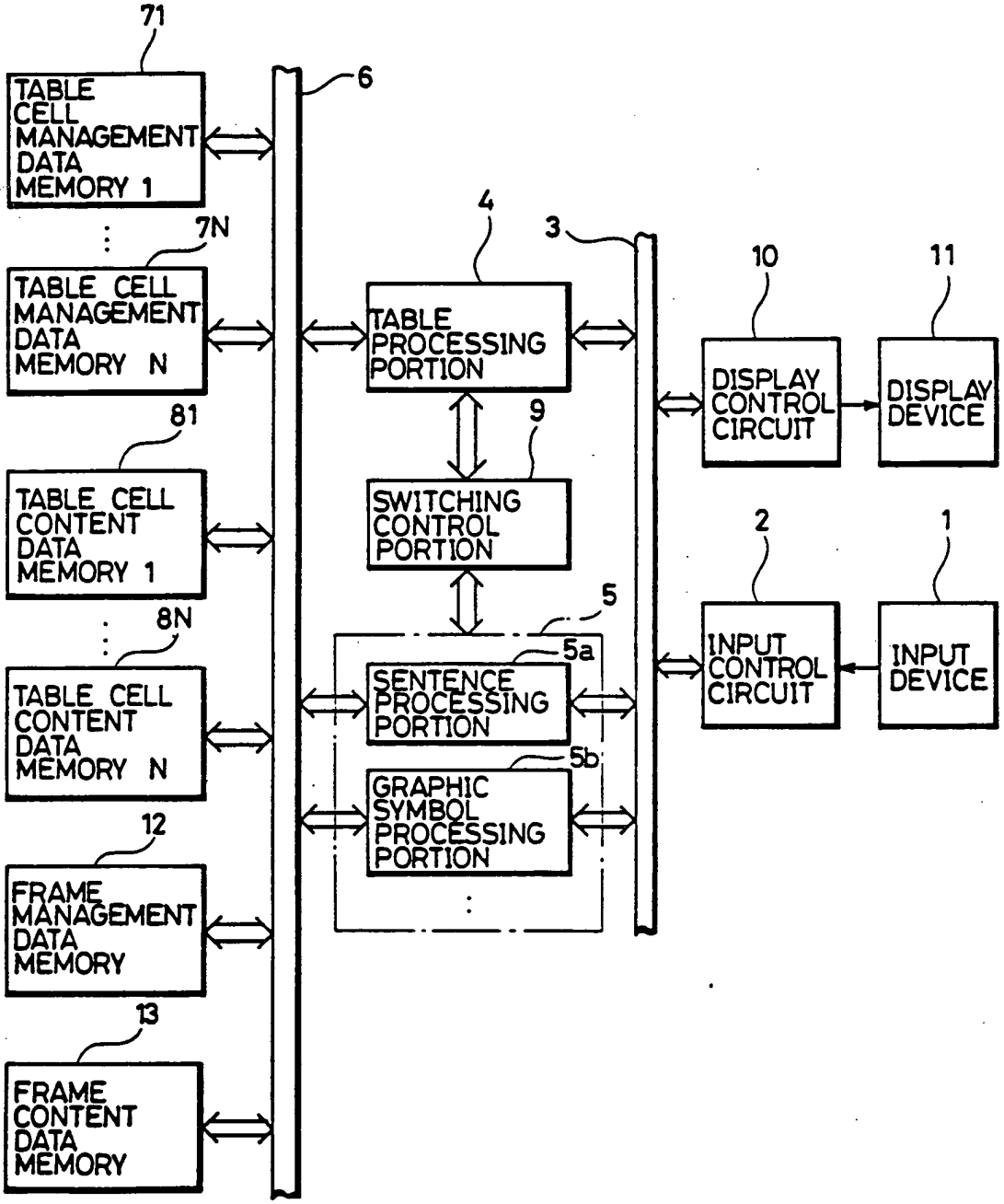

71
TABLE CELL MANAGEMENT DATA MEMORY 1
7N
TABLE CELL MANAGEMENT DATA MEMORY N
81
TABLE CELL CONTENT DATA MEMORY 1
8N
TABLE CELL CONTENT DATA MEMORY N
12
FRAME MANAGEMENT DATA MEMORY
13
FRAME CONTENT DATA MEMORY
6
4
TABLE PROCESSING PORTION
9
SWITCHING CONTROL PORTION
5
5a
SENTENCE PROCESSING PORTION
5b
GRAPHIC SYMBOL PROCESSING PORTION
3
10
DISPLAY CONTROL CIRCUIT
11
DISPLAY DEVICE
2
INPUT CONTROL CIRCUIT
1
INPUT DEVICE

FIG.11

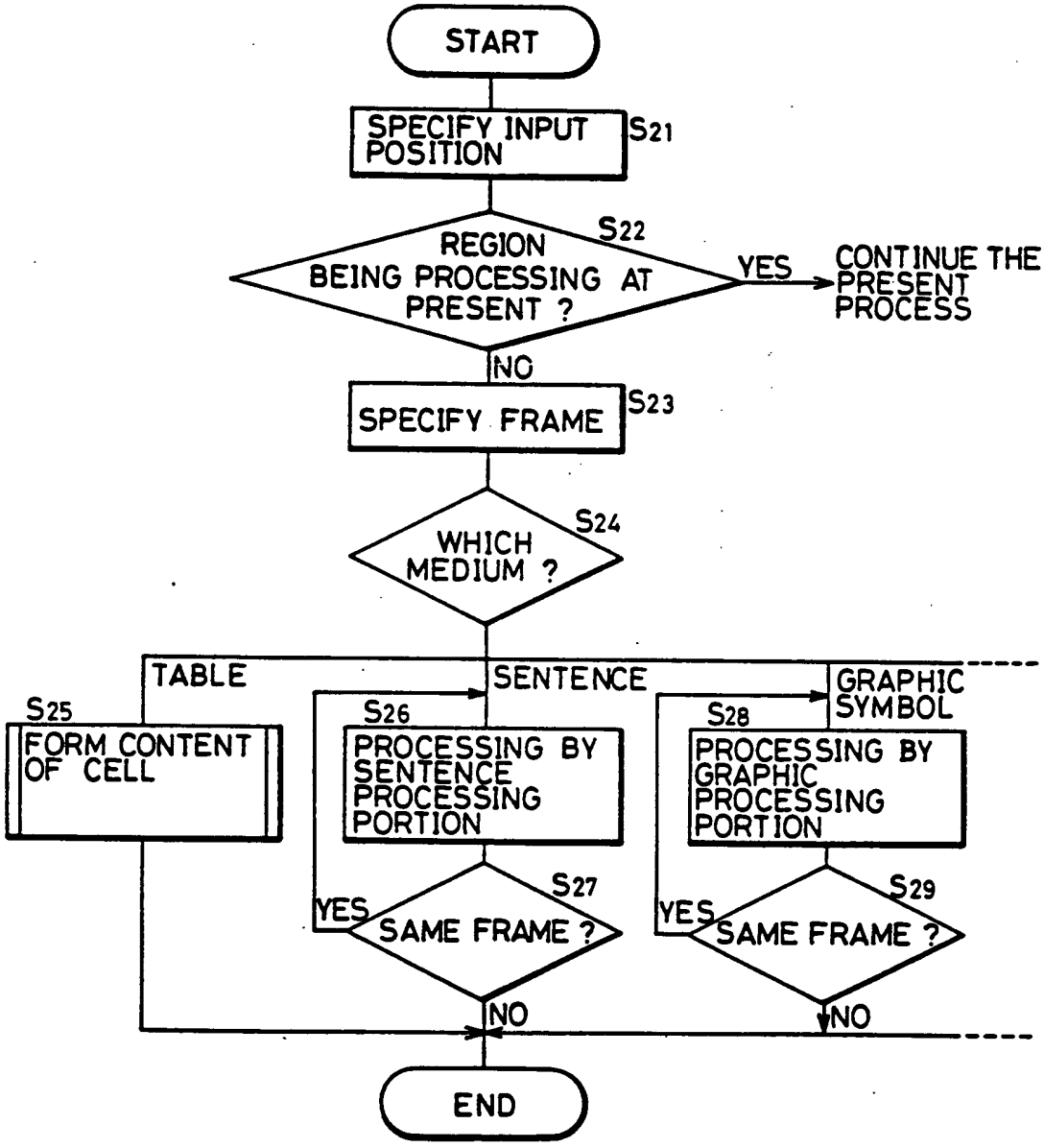

START
SPECIFY INPUT POSITION
S21
REGION BEING PROCESSING AT PRESENT ?
S22
YES
CONTINUE THE PRESENT PROCESS
NO
SPECIFY FRAME
S23
WHICH MEDIUM ?
S24
TABLE
SENTENCE
GRAPHIC SYMBOL
S25
FORM CONTENT OF CELL
S26
PROCESSING BY SENTENCE PROCESSING PORTION
S28
PROCESSING BY GRAPHIC PROCESSING PORTION
YES
SAME FRAME ?
S27
YES
SAME FRAME ?
S29
NO
NO
END

FIG.9

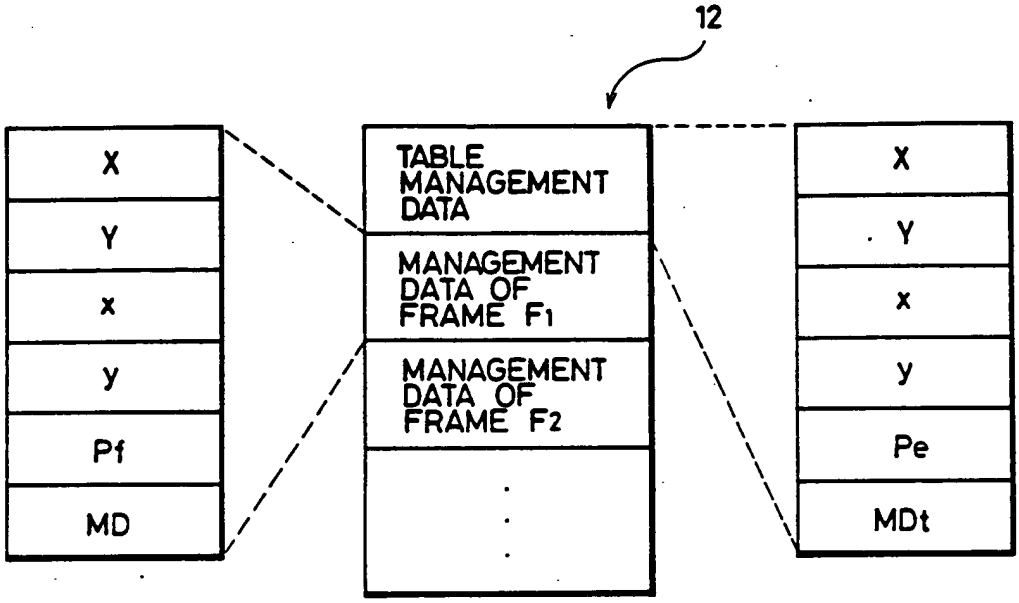

12
X
Y
x
y
Pf
MD
TABLE MANAGEMENT DATA
MANAGEMENT DATA OF FRAME F1
MANAGEMENT DATA OF FRAME F2
X
Y
x
y
Pe
MDt

FIG.10

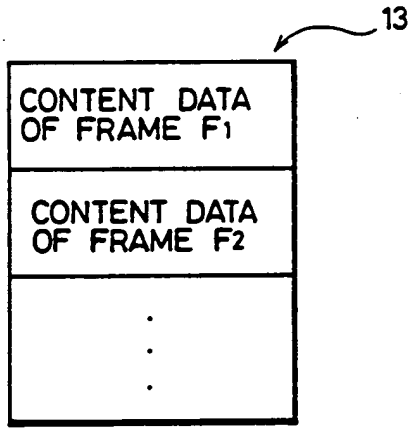

13
CONTENT DATA OF FRAME F1
CONTENT DATA OF FRAME F2

FIG.8

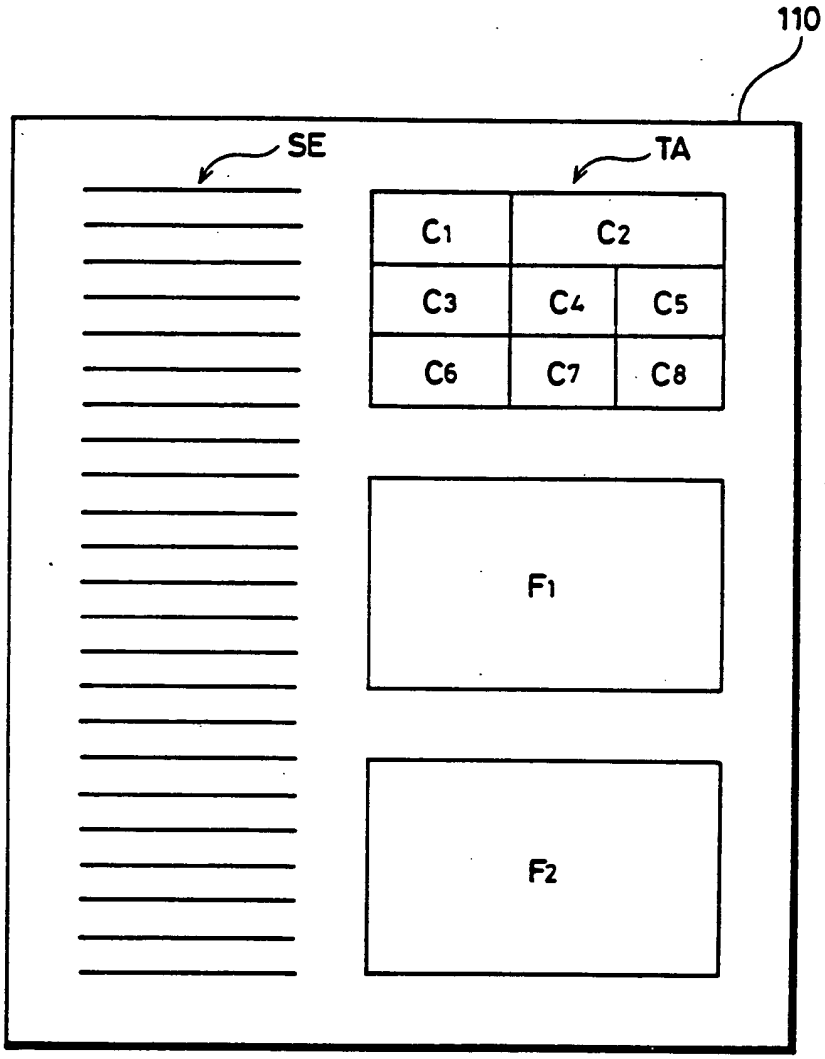


FIG.7

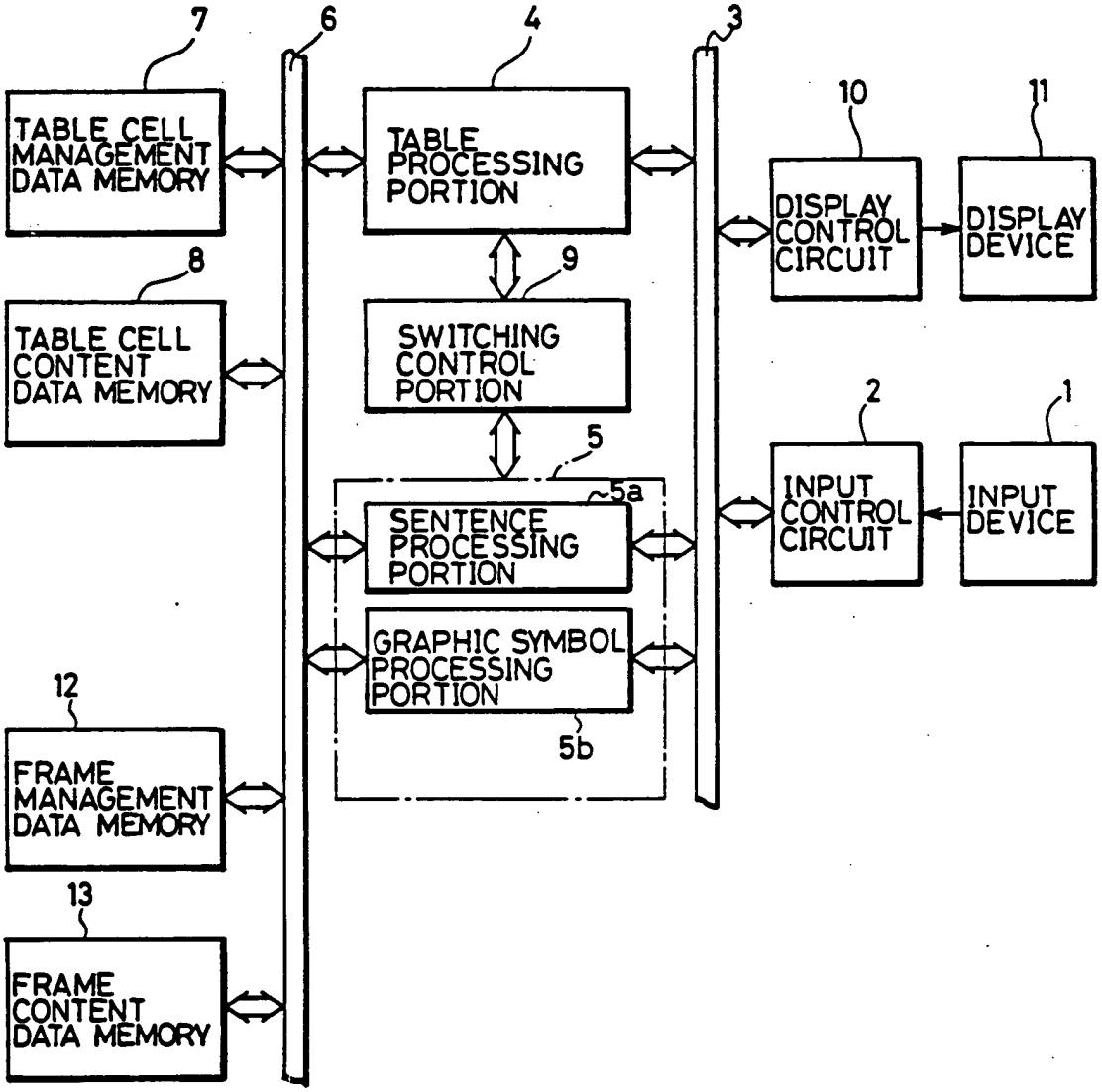

7
6
4
3
TABLE CELL MANAGEMENT DATA MEMORY
TABLE PROCESSING PORTION
10
11
DISPLAY CONTROL CIRCUIT
DISPLAY DEVICE
8
9
TABLE CELL CONTENT DATA MEMORY
SWITCHING CONTROL PORTION
2
1
5
5a
INPUT CONTROL CIRCUIT
INPUT DEVICE
SENTENCE PROCESSING PORTION
GRAPHIC SYMBOL PROCESSING PORTION
5b
12
FRAME MANAGEMENT DATA MEMORY
13
FRAME CONTENT DATA MEMORY

FIG.6

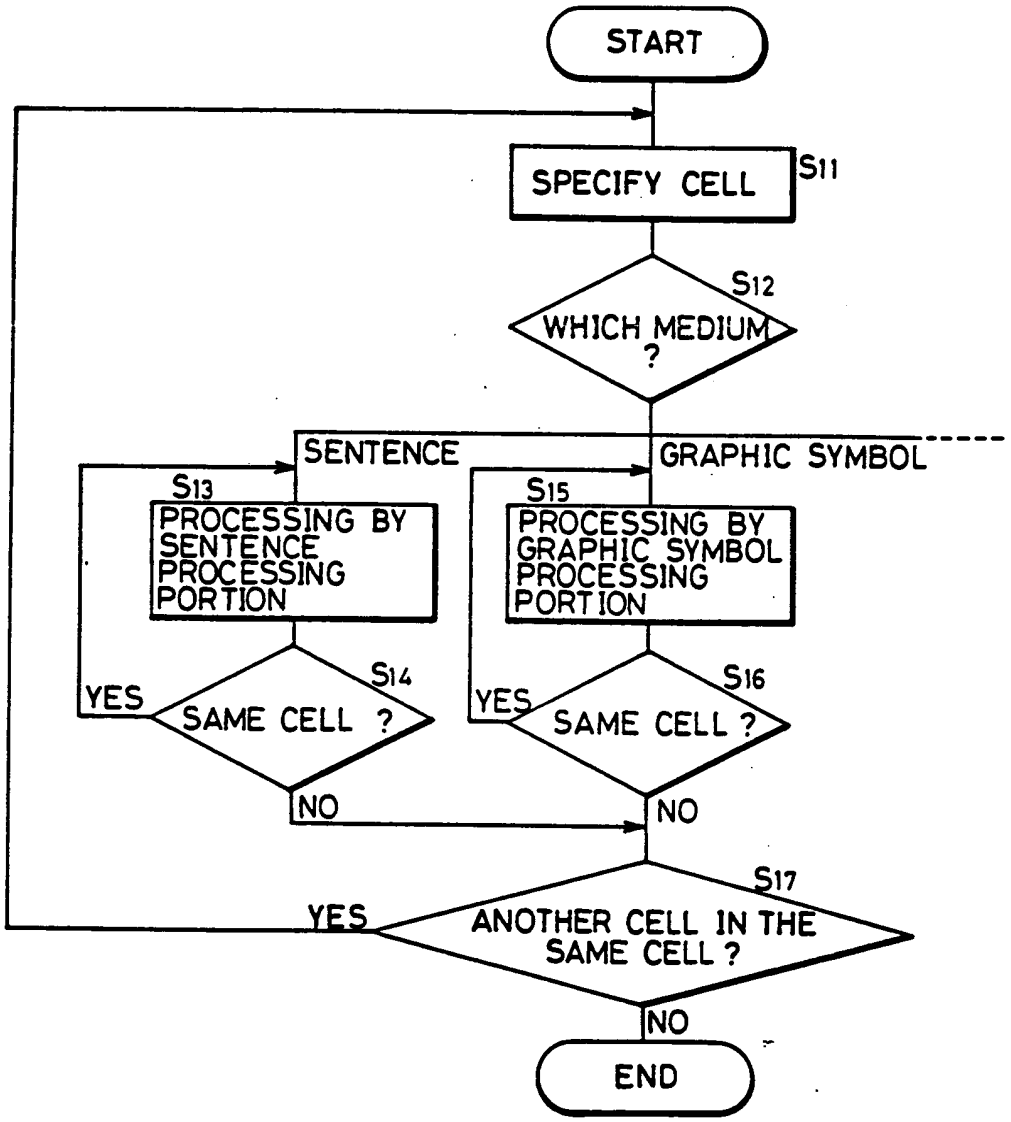

START
SPECIFY CELL
S11
S12
WHICH MEDIUM ?
SENTENCE
GRAPHIC SYMBOL
S13
PROCESSING BY SENTENCE PROCESSING PORTION
S15
PROCESSING BY GRAPHIC SYMBOL PROCESSING PORTION
S14
YES
SAME CELL ?
S16
YES
SAME CELL ?
NO
NO
S17
YES
ANOTHER CELL IN THE SAME CELL ?
NO
END

FIG.5

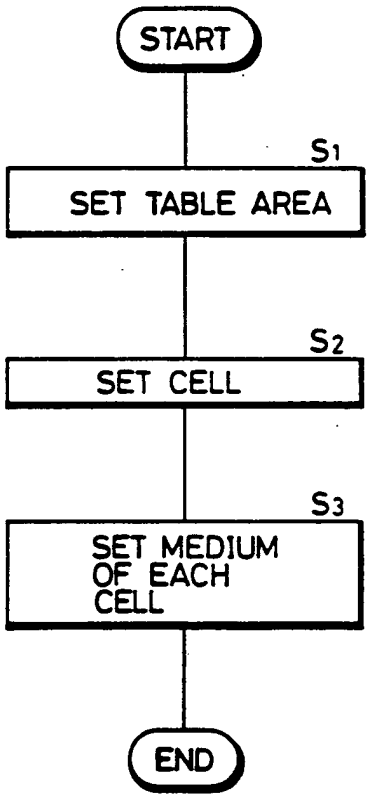

START
S1
SET TABLE AREA
S2
SET CELL
S3
SET MEDIUM OF EACH CELL
END

FIG.3

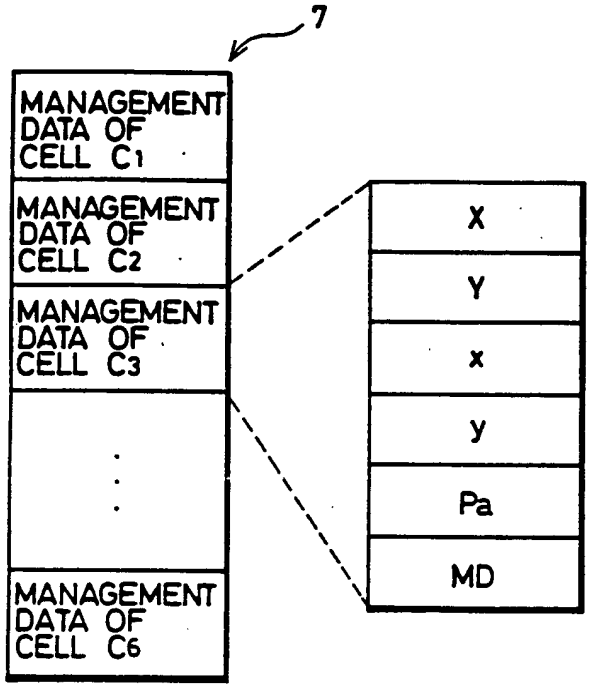

7
MANAGEMENT DATA OF CELL C1
MANAGEMENT DATA OF CELL C2
MANAGEMENT DATA OF CELL C3
MANAGEMENT DATA OF CELL C6
X
Y
x
y
Pa
MD

FIG.4

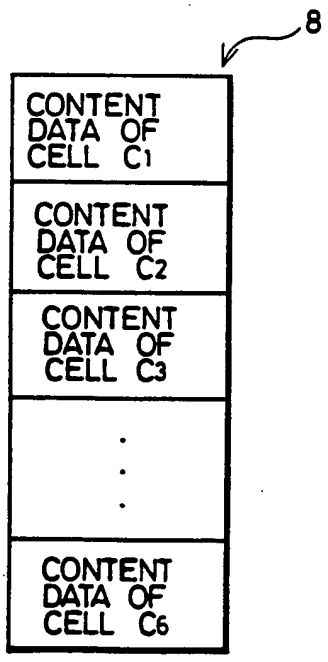

8
CONTENT DATA OF CELL C1
CONTENT DATA OF CELL C2
CONTENT DATA OF CELL C3
CONTENT DATA OF CELL C6

FIG.2

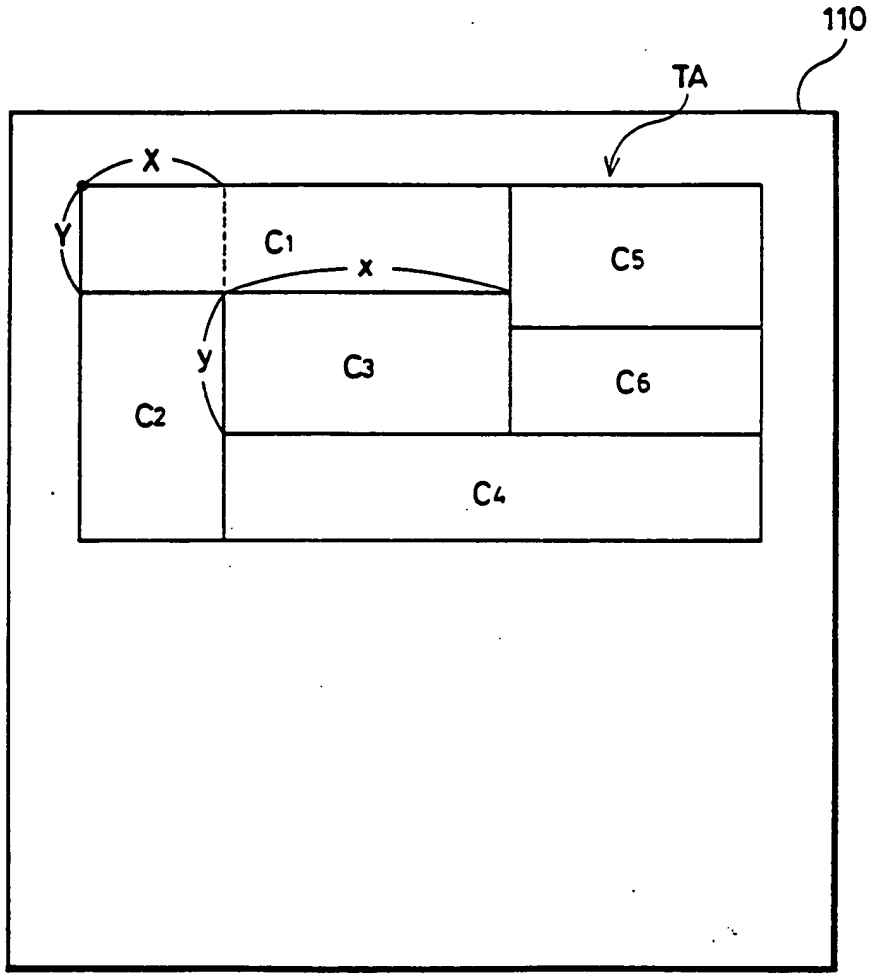
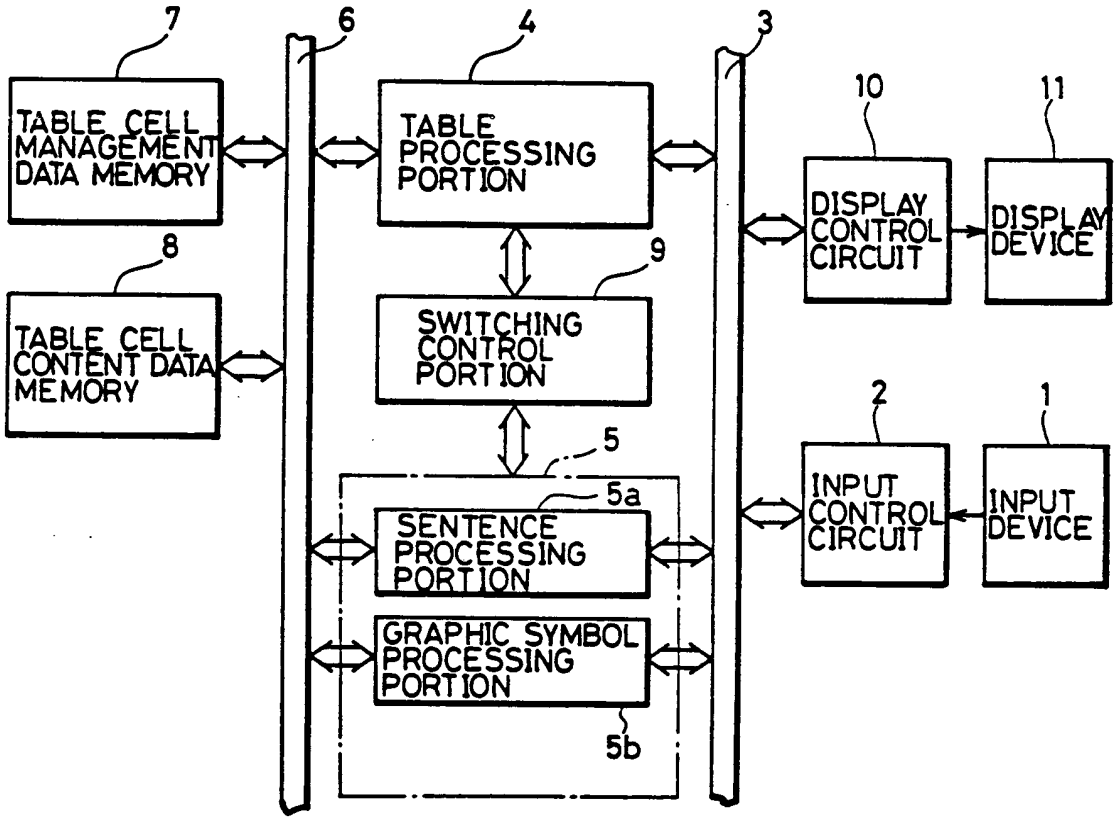


FIG. 1


7
6
4
3
10
11
TABLE CELL MANAGEMENT DATA MEMORY
TABLE PROCESSING PORTION
DISPLAY CONTROL CIRCUIT
DISPLAY DEVICE
8
9
TABLE CELL CONTENT DATA MEMORY
SWITCHING CONTROL PORTION
2
1
5
5a
INPUT CONTROL CIRCUIT
INPUT DEVICE
SENTENCE PROCESSING PORTION
GRAPHIC SYMBOL PROCESSING PORTION
5b

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